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PROGRESS REPORT ON GRASS EXPERIMENTS

TEXAS AGRICULTURAL EXPERIMENT STATION
Spur, Texas
In Cooperation with
SOIL CONSERVATION SERVICE
U. S. DEPARTMENT OF AGRICULTURE
December, 1936

We cannot pay too high a tribute to the intrepid explorers who have searched the earth for new plants that would add to our agricultural wealth. These men have contributed immeasurably to the fruits of harvest and merit the praise of all who are interested in agricultural development. On the other hand, it is possible that in our zeal to obtain new plants we have in many cases overlooked the potentialities of our native plants. This is true of our pasture plants, and the neglect of native buffalo grass is a specific instance. It is definitely known that with only a minimum of care buffalo grass will give a response that amply repays efforts expended in its behalf. Certainly where a plant of this kind responds readily to kind treatment it is worth while to determine what conditions are necessary to bring it into maximum production.

The Station "Stomp Lot"

On the Spur Station there is a 41-acre block of land having some comparatively steep slopes, thin soil, and is traversed by a ravine. It has been heavily grazed through the years with cattle, sheep and horses. Tobosa grass, prickly pear, mesquite brush, and weeds had largely replaced the nutritious grasses by 1932. It had become a typical West Texas "stomp lot". It was unproductive. In 1932 a start was made to determine what could be done to make this land produce a return on the investment. During the past five years extra labor and regular labor at odd times have been used to:

(a) Grub mesquite brush and prickly pear
(b) Divert water on to the land from adjacent roadways
(c) Plow down banks of ravine and sod to bermuda grass
(d) Manure heavily a five-acre block
(e) Build two terraces
(f) Contour list ten acres
(g) Mow weeds in 1935 on twelve acres

The practice of deferred grazing has been used. At no time have livestock been allowed on this pasture unless grazing was good. It has been impossible to appraise separately the value of each of the above operations in improving this small pasture, but it has been very interesting to note the response in increased

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The Station "Trash Lot"

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grass growth and carrying capacity. A record kept during 1936 shows 3,395 steer days, 1,718 milk cow days and 20 mule days, or a total of 5,113 stock days on the pasture. This is an average of 2.92 acres per head of livestock per year. The steers made a total gain of 4,888 pounds on pasture which shows a return of $293.28 when beef is figured at six cents per pound of gain. Or, the return from the steers on pasture was $7.15 per acre.

Contour Listing of Native Grassland

In May of 1932 a five-acre block of native grassland was listed on contours to a depth of three inches. The lister furrows were 39 inches apart. The grass along the furrow edge made a remarkable growth. It remained green much longer than the grass on unlisted land and the cattle showed a preference for it in grazing. The practice gave so much promise that additional areas were listed in 1934 and 1936. During each succeeding year the observations made in 1932 were confirmed. Wire netting cages four feet by six feet were placed at twelve points in the pasture to protect the grass from cattle. These areas were harvested, and the grass yields are given in the following table.

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	Pounds of dry grass per acre	
	1935	1936
Solid contour listed in 1934	2,423	2,315
No treatment	857	592
Solid contour listed in 1936		1,326

Soil moisture determinations made on October 17, 1936, following 11.13 inches of rain in September showed a penetration of water to a depth of 72 inches on the contour listed land and an available moisture supply in the soil of 6.67 inches. On the unlisted land the depth of penetration was 30 inches and the available soil moisture only 2.10 inches. The yield of grass on both areas that was produced by heavy rains in September was approximately 20 percent of the total yield.

Sections of soil 15 inches square and six inches thick were removed to a depth of 66 inches on both the listed and unlisted areas. The grass roots were carefully washed from the soil and the root volume determined by water displacement. In the samples taken from land listed in 1934 there were 594 cubic centimeters of roots and there were 363 cubic centimeters in the samples from the unlisted land. The root system had thus been increased 64 percent by contour listing.

Grass has truly given a hearty response to kind treatment. Many practices may be put into effect that will give practical increases in yield. The problem deserves careful study.

Grass Effectively Uses Large Amounts of Water

A dense covering of grass is an almost impregnable barrier against runoff and soil erosion. The porous, humus-laden soil under the grass absorbs water rapidly. Rain falling upon sod does not beat the soil into a muddy suspension, thus the water that passes downward is fairly clear and does not obstruct its own passageways with suspended material.

Grass provides a set-up for a quick turnover of water. It can transpire large quantities in a short time, leaving room in the soil for water of subsequent rains. Few crops have the ability to use as large quantities of water as does grass.

Well sodded flats may be used to advantage as a dumping place for storm water coming from highways, steep rocky land, or that diverted from gullies and ravines. This system of water diversion is already being widely used. When the grassland of West Texas is properly watered the flood problem will be largely solved.

Conditions Affecting the Natural Vegetation

Overgrazing and the natural recurrence of drouths have caused some of the best grasses to disappear from much of the range land of West Texas. These valuable grasses have been largely replaced by brush, weeds and coarse or unpalatable grasses.

Contour listing and flooding of grassland produce favorable conditions which enable the more desirable grasses to offer stronger competition to the less desirable types. Under favorable moisture conditions buffalo and grama grasses have encroached rapidly upon land covered by weeds and tobosa grass.

Wild rye, an excellent winter grass, covered 25 percent of the surface of listed pasture land at the middle of December, 1936, while only a few plants occurred on adjacent areas not listed. Bitter weeds covered 35 percent of the surface of unlisted land with only a few plants occurring on adjacent land that had been contour listed. Grama grass covered three times as much surface on land that had been contoured as on land that had not been treated.

By giving pastures proper care over a period of years it is possible that many of the undesirable species will be practically eliminated and the more desirable ones materially increased.

Buffalo Grass Selections

Forty four male and forty four female plants of buffalo grass were obtained in five-inch sods and set in plats five feet

square on May 15, 1934. They received a thorough watering at the time they were set out but have received no additional water except that occurring during rain storms. A large amount of water from other areas has been diverted on to this grass area.

The soil on which the sodding was done is Abilene clay loam, a very fertile soil, but considered drouthy. The grass grew very rapidly during the summer of 1934 and by mid-summer of 1935 had covered the 25 square feet allotted to each plant. Yields of grass were not taken during 1934 but in 1935 the grass was clipped with shears to simulate close grazing by sheep. Two clippings were made in 1935 and three in 1936. Below is given the average yield of dry grass on acre basis clipped from the grasses areas.

1935			1936	
Date Clipped	Yield per acre, lbs.		Date Clipped	Yield per acre, lbs.
July 15	7,170		May 17	3,177
Dec. 15	2,040		Aug. 2	2,414
			Dec. 15	981
Total	9,215			6,572

In 1936 sudan grass planted in three-foot rows on adjacent areas grew to a height of seven feet but yielded slightly less hay per acre. The buffalo grass got an early start and had produced a good crop before time for planting sudan.

The root system under one of the buffalo grass plats was removed by washing away the soil with water. The system was a mass of fibrous interlacing roots and rootlets extending to a depth of 6 to 7 feet. Determinations revealed that there was approximately three-fourths of a mile of root system under a square foot of the grass.

Large cracks occurred in the soil between the plants during dry periods. Immense amounts of water poured into these cracks at the time of washing rains. Possibly the formation of cracks is one of nature's ways of storing storm water deep in the subsoil. Cracks may have values to offset in part some of their objectionable features.

No two of the grass plants are alike. They vary materially in ability to yield. A very vigorous growing female plant produced at the rate of 10,717 pounds of dry grass per acre while another of the selections produced at the rate of only 3,386 pounds per acre. There is a marked difference in many of the botanical features, more especially in the fruiting habits. Opportunities for improvement of buffalo grass through selection appear to be unlimited.